

WHAT IS CLAIMED IS:

1. A method for repairing a workpiece, the method comprising:  
providing a workpiece having a defect and an area proximate to the  
5 defect;  
routing a portion of the workpiece including the defect such that  
routing removes at least a portion of the workpiece proximate to the defect, wherein  
routing comprises controlling a depth to which the workpiece is routed with a micro-  
stop countersink apparatus; and  
10 flame spraying the portion of the workpiece that has been removed by  
routing such that new material is added to fill the portion of the workpiece that has  
been routed.
2. The method according to Claim 1, wherein the micro-stop countersink  
15 apparatus is capable of receiving a router bit, and wherein routing comprises aligning  
the micro-stop countersink apparatus with the workpiece and then plunging the router  
bit into the workpiece.
3. The method according to Claim 1, wherein routing comprises plunging  
20 a router bit into the portion of the workpiece including the defect such that the router  
bit contacts the defect and the area proximal to the defect in a direction generally  
orthogonal to the workpiece such that the routed portion of the workpiece is defined  
by a sidewall extending generally orthogonal to the workpiece and a conical bottom  
surface.  
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4. The method according to Claim 1, wherein controlling the depth  
comprises controlling the depth to permit removal in predefined increments.
5. The method of Claim 1, wherein routing comprises routing the  
30 workpiece with a router bit having two cutting edges.

6. The method according to Claim 1, wherein routing comprises routing the workpiece with a router bit having cutting edges with a relief angle of less than 3 degrees.
- 5 7. The method according to Claim 1, wherein routing comprises routing the workpiece with a router bit having a diameter of at least 20 times a depth of the portion removed by routing.
8. The method according to Claim 1, wherein providing the workpiece  
10 comprises providing an aircraft skin having a defect.
9. The method of Claim 1, further comprising blasting the portion of the workpiece that has been routed using grit to remove foreign particles prior to flame spraying.
- 15 10. The method of Claim 1, further comprising sanding the portion of the workpiece that has been flame sprayed.
11. The method of Claim 10, further comprising polishing the portion of  
20 the workpiece that has been flame sprayed following sanding.
12. The method of Claim 1, wherein routing further comprises routing the workpiece to a depth of 10% or less of the thickness of the workpiece.
- 25 13. A method for repairing a workpiece, the method comprising:  
providing a workpiece having a defect and an area proximate to the defect;  
plunging a router bit into the portion of the workpiece including the defect, wherein the router bit contacts the defect and the area proximal to the defect in  
30 a direction generally orthogonal to the workpiece to remove a portion of the workpiece including the defect such that the routing removes at least a portion of the workpiece proximate to the defect, and wherein the routed portion is defined by a sidewall extending generally orthogonal to the workpiece and a bottom surface; and

flame spraying the portion of the workpiece that has been removed by routing such that new material is added to fill the portion of the workpiece that has been routed.

5           14.     The method according to Claim 13, wherein plunging comprises controlling a depth to which the workpiece is routed with a micro-stop countersink apparatus.

10           15.     The method according to Claim 14, wherein the micro-stop countersink apparatus is capable of receiving the router bit, and wherein routing comprises aligning the micro-stop countersink apparatus with the workpiece and then plunging the router bit into the workpiece.

15           16.     The method according to Claim 14, wherein controlling the depth comprises controlling the depth to permit removal in predefined increments.

            17.     The method of Claim 13, wherein plunging the router bit comprises forming the routed portion to have a conical bottom surface.

20           18.     The method of Claim 13, further comprising providing a router bit having two cutting edges.

            19.     The method according to Claim 13, further comprising providing a router bit having cutting edges with a relief angle of less than 3 degrees.

25           20.     The method of Claim 13, further comprising providing a router bit having a diameter of at least 20 times a depth of the portion that has been routed.

            21.     The method according to Claim 13, wherein providing the workpiece comprises providing an aircraft skin having a defect.

            22.     The method of Claim 13, further comprising blasting the portion of the

workpiece that has been routed using grit to remove foreign particles prior to flame spraying.

23. The method of Claim 13, further comprising sanding the portion of the  
5 workpiece that has been flame sprayed.

24. The method of Claim 23, further comprising polishing the portion of  
the workpiece that has been flame sprayed following sanding.

10 25. The method of Claim 13, wherein plunging the router bit comprises  
plunging the router bit to a depth of 10% or less of the thickness of the workpiece.